



# Near-term Navy Officer Loss Forecasting Model

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**Navy Personnel Research, Studies, & Technology**

# Officer Personnel Force Management

**NPRST**



**Key “Accurate Predictions” --  
Particularly Losses**

Navy Personnel Research, Studies, & Technology

# Planning Horizon

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<b>Past Years</b>	<b>Execution Year</b>	<b>Budget Year and Outyears</b>
<b>Historical Data</b>	<b>Execution Year Forecast &amp; Plans</b>	<b>Forecasting of Outyears</b>

# Operational Problem

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- **Officer Force Analysts have limited means of predicting future behavior of the officer force**

**Inaccurate predictions create management problems**

- **Hypothesis 1: “Combining historical loss rates with near term information will lead to more accurate loss forecast”**
- **Hypothesis 2: “Accurate loss predictions will lead to more accurate inventory plans”**

# **Inaccurate Forecast Characteristics**

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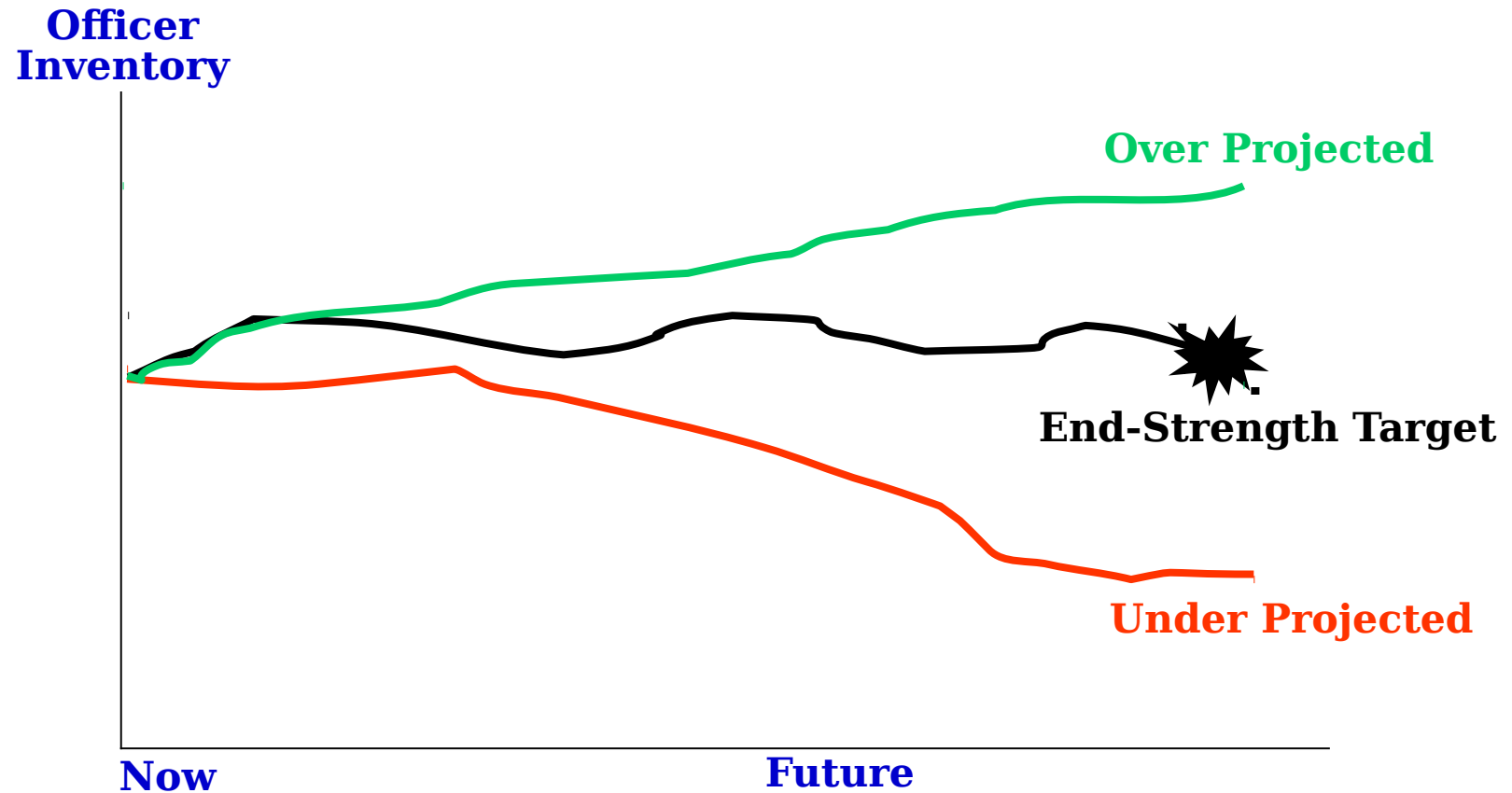


- **Over/under projections**

**Management reactions are to adjust their controls, e.g., accessions, promotions, retention efforts**

**Result is potential over (or under) executed endstrength (ES), violated laws, and budget implications**

# Inaccurate Loss Forecast Ref. Mode



## Method

- **Mathematical technique to blend historical loss rates with knowledge of near-term pending losses to produce a 12-month loss forecast**

**Historical loss rates -- derived from analysis of historical loss behavior (common practice)**

**Pending loss rates -- derived from assumptions, loss processing (no evidence of s**

**Blend**  
**loss**

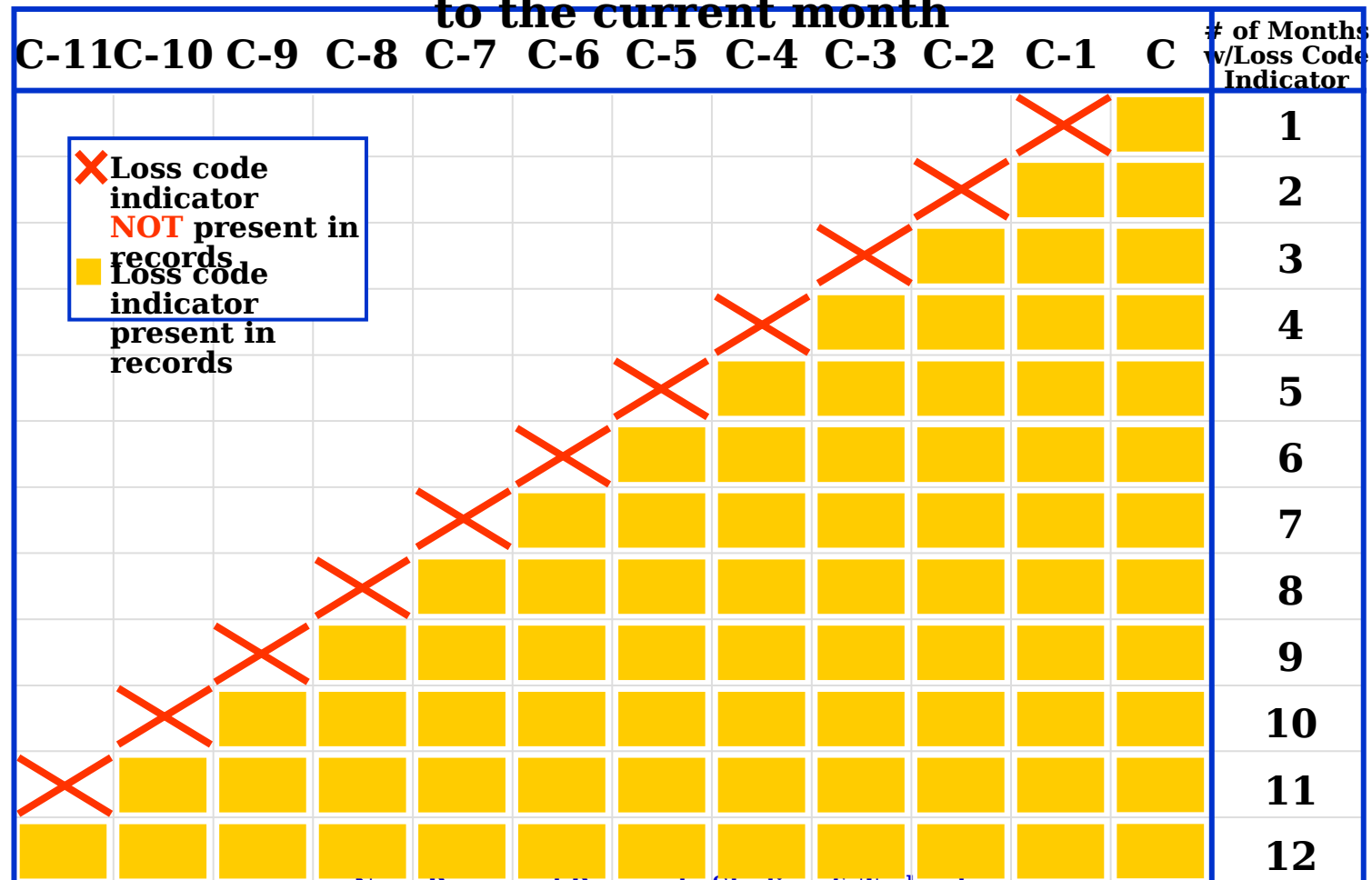
$$\text{NumProjLoss} = C * \text{Pproj} + (1-C) * \text{LRProj}$$

**Pproj = pending projection**  
**&**

# Loss Code Indicator -- Record Analysis

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C represent current month, and C - # represents the month prior to the current month

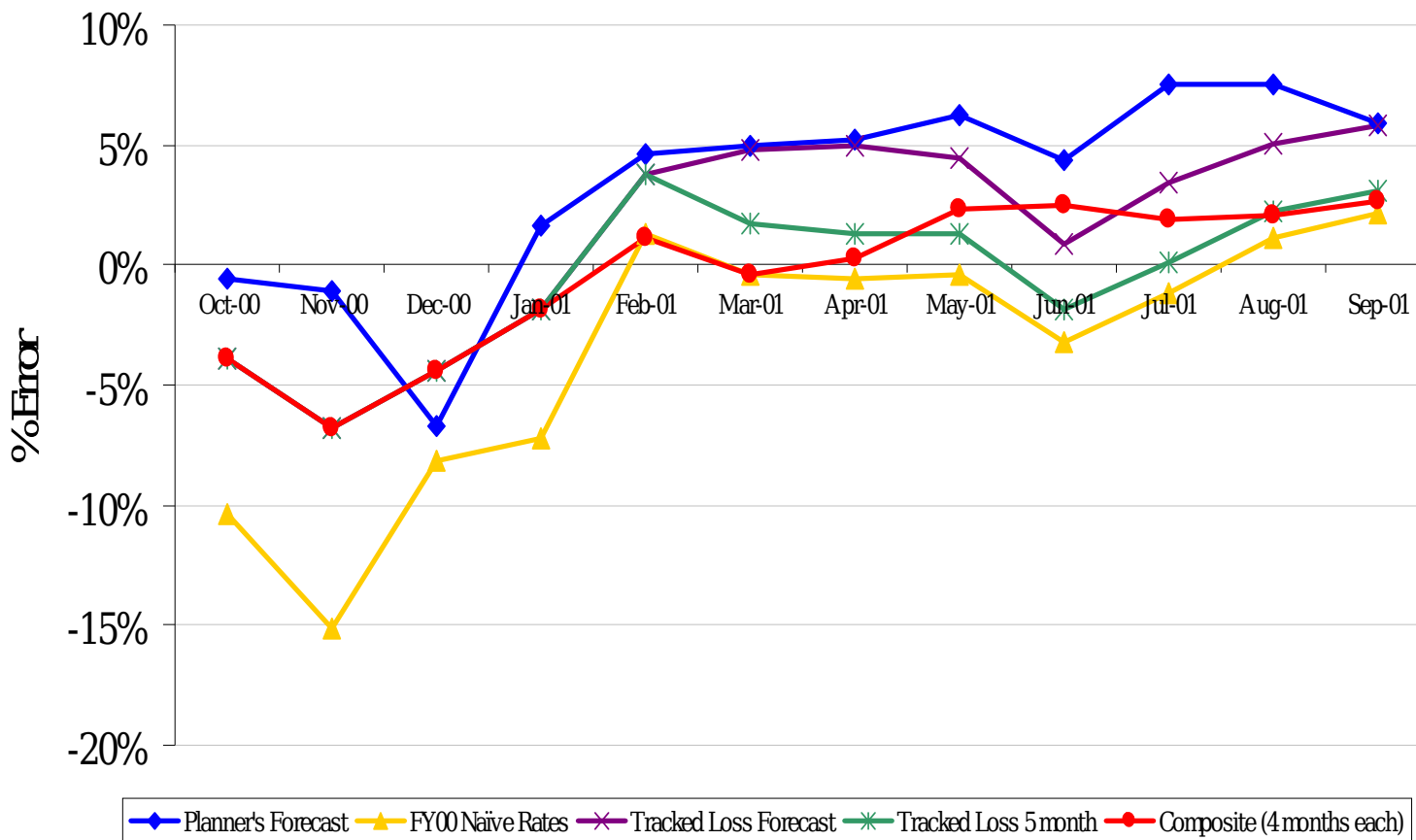




# Comparison Graphs

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**Cumulative % Error =  $\Sigma$  (Forecast - Actual) / A**



**Cumulative % Error = S (Forecast - Actual) / Actual**

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	<i>Planner's Forecast</i>	<i>Weighted Historical Rates</i>	<i>7770 Naïve Rate</i>	<i>Tracked Loss Forecast</i>	<i>Tracked Loss 5 month</i>	<i>Composite (4 months each)</i>
<b>Oct-00</b>	-0.56%	-10.89%	-10.41%	-3.87%	-3.87%	-3.87%
<b>Nov-00</b>	-1.04%	-12.13%	-15.13%	-6.77%	-6.77%	-6.77%
<b>Dec-00</b>	-6.67%	-5.82%	-8.17%	-4.42%	-4.42%	-4.42%
<b>Jan-01</b>	1.62%	-6.35%	-7.19%	-1.83%	-1.83%	-1.83%
<b>Feb-01</b>	4.64%	0.16%	1.27%	3.74%	3.74%	1.13%
<b>Mar-01</b>	4.95%	0.48%	-0.37%	4.82%	1.70%	-0.43%
<b>Apr-01</b>	5.21%	3.28%	-0.60%	4.98%	1.28%	0.30%
<b>May-01</b>	6.27%	5.06%	-0.40%	4.45%	1.27%	2.30%
<b>Jun-01</b>	4.41%	2.71%	-3.25%	0.92%	-1.85%	2.51%
<b>Jul-01</b>	7.54%	5.24%	-1.13%	3.41%	0.10%	1.94%
<b>Aug-01</b>	7.53%	6.26%	1.13%	5.08%	2.23%	2.08%
<b>Sep-01</b>	5.90%	7.49%	2.12%	5.84%	3.11%	2.67%

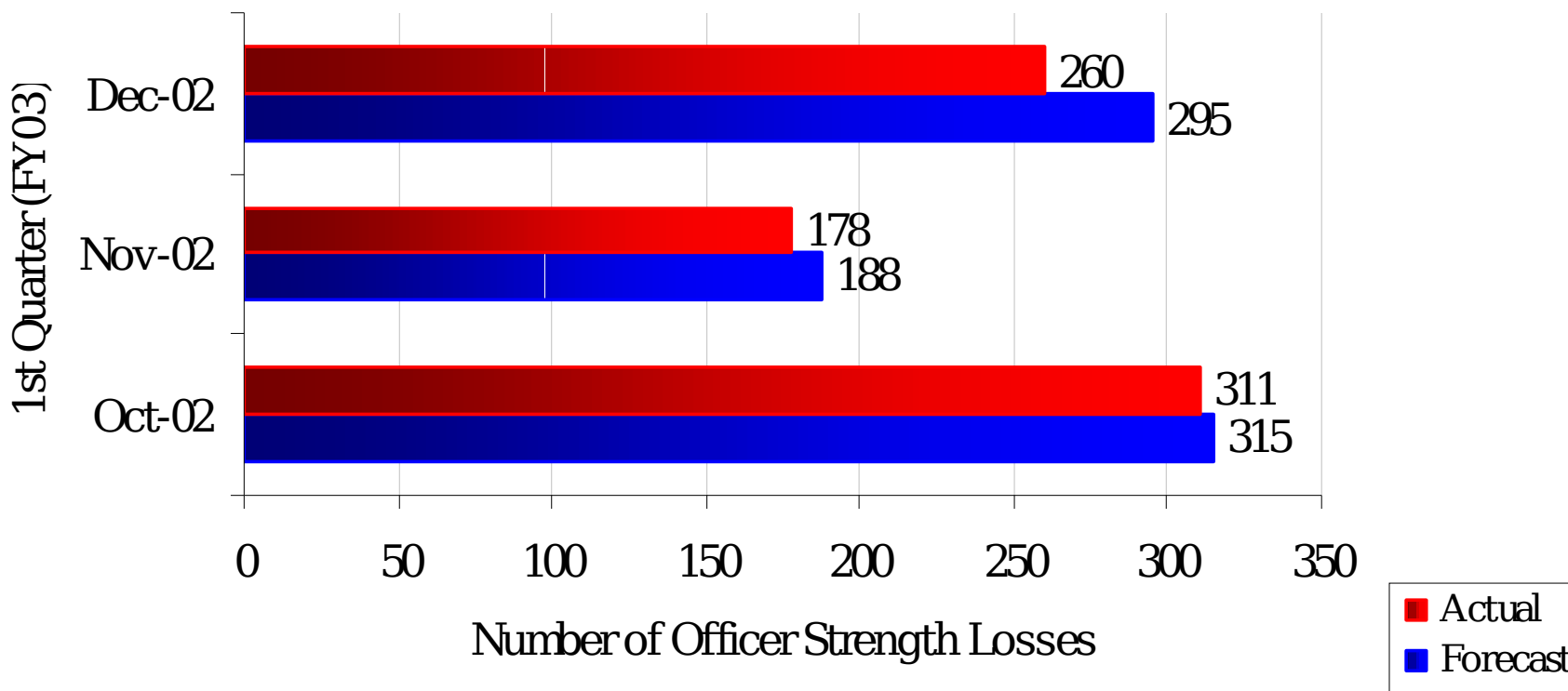
< 6 Months

> 6 Months

# Ongoing Forecast Validation

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## 1st Quarter Validation



# Research Team

**NPRST**

- **Principal Investigator - Rodney Myers**  
**Gary Ropp (DynCorp)**  
**Angela Cho (DynCorp)**
- **Stakeholders**  
**Officer Plans and Policies Branch (N131)**
  - › **Primary POC:**
    - **LCDR Jim Henry (Officer Strength Plans)**
    - **Senoria Ford**

# Backups

# Loss Types

<b>Code</b>	<b>Description</b>
<b>111</b>	<b>Non-conventional retirement</b>
<b>112</b>	<b>Statutory retirement</b>
<b>113</b>	<b>Retirement</b>
<b>114</b>	<b>Resignation</b>
<b>115</b>	<b>Release</b>
<b>116</b>	<b>Release with pay *</b>
<b>118</b>	<b>Discharge (other)</b>
<b>119</b>	<b>Discharge with separation pay *</b>
<b>198</b>	<b>TAR</b>
<b>200</b>	<b>File correct</b>

\* Fail Select